

ST. CROIX RIVER, WIS. AND MINN.

LETTER

FROM

THE SECRETARY OF WAR

TRANSMITTING

**A REPORT FROM THE CHIEF OF ENGINEERS ON PRELIMINARY
EXAMINATION AND SURVEY OF ST. CROIX RIVER FROM STILL-
WATER, MINN., TO ITS MOUTH**

MAY 12, 1926.—Referred to the Committee on Rivers and Harbors and ordered
to be printed

WAR DEPARTMENT,
Washington, May 11, 1926.

The SPEAKER of the HOUSE of REPRESENTATIVES.

DEAR MR. SPEAKER: I am transmitting herewith a report, dated the 8th instant, from the Chief of Engineers, United States Army, on preliminary examination and survey of St. Croix River from Stillwater, Minn., to its mouth, authorized by the river and harbor act approved March 3, 1925, together with accompanying papers.

Sincerely yours,

DWIGHT F. DAVIS,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 8, 1926.

Subject: Preliminary examination and survey of St. Croix River from Stillwater, Minn., to its mouth.

To: The Secretary of War.

1. I submit, for transmission to Congress, my report on preliminary examination and survey of St. Croix River from Stillwater, Minn., to its mouth, authorized by the river and harbor act approved March 3, 1925, together with accompanying papers.

2. The St. Croix River rises in northwestern Wisconsin and flows into the Mississippi about 27 miles below St. Paul. The section under consideration, which is known as St. Croix Lake, is 23.6 miles long and from 1,500 to 6,500 feet wide. Except at three localities where the deltas of tributaries have narrowed and shoaled the channel, it has depths of 20 to 35 feet. The river is being improved by the United States under a project providing for a channel 3 feet deep between the mouth and Taylors Falls, Minn., 52 miles, to be obtained by wing dams, bank protection, and dredging. The project was completed some years ago, but the channel has deteriorated in recent years. Local interests desire a channel 200 feet wide and 6 feet deep from the mouth to Stillwater.

3. At the present time no commerce moves over the river, partly because of the lack of floating equipment, but largely on account of the limited depth available. One small barge line is now operating on the upper Mississippi, and it is stated would also operate on the St. Croix if the channel were improved. The Inland Waterways Corporation has entered into a contract with interests on the upper Mississippi and St. Croix Rivers for the operation of additional towboats and barges, which are under construction. It is claimed that some 240,000 tons of freight would move over the St. Croix if a 6-foot channel were available.

4. The district engineer states that a municipal terminal with rail connections now exists at Stillwater. He points out that the cost of transporting by river certain of the items listed by local interests as prospective commerce would in some cases represent a saving of as much as \$1 per ton. Since freight rates from points in the Northwest are the same to Stillwater as to St. Paul, the former would offer a favorable transfer point between rail and barge for traffic to and from that section. In this respect Stillwater has certain advantages over St. Paul in that it has better natural sites where terminals can be developed. The estimated cost of dredging a channel through the three shoals on the St. Croix is \$19,000, with \$2,000 annually for maintenance. The district engineer believes the work justified, and recommends that the project be modified accordingly. The division engineer concurs, but feels that the work should be made a part of the project for the upper Mississippi.

5. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, agreeing with the district engineer.

6. After due consideration of the above-mentioned reports, I concur in the views of the district engineer and the Board of Engineers for Rivers and Harbors. For a number of years there has been only limited use of the upper Mississippi for the transportation of freight or passengers. Arrangements have now been made, however, which should insure the development of regular transportation lines, and it is likely that these will also make use of the St. Croix River. The rate situation and the favorable conditions which obtain at Stillwater and on the St. Croix River point to the possibility of the development of an important transfer of freight between rail and barge at that point. A considerable local traffic is also possible. The prospective benefits are ample to justify the small expenditure required. I therefore report that modification of the existing project for the improvement of the St. Croix River, Wis., and Minn.,

is deemed advisable to the extent of providing for a channel 200 feet wide and 6 feet deep at low water from Stillwater to the mouth, at an estimated cost of \$19,000, with \$2,000 annually for maintenance. The entire amount of the estimated first cost should be made available in the initial appropriation.

H. TAYLOR,

Major General, Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

SYLLABUS

The Board of Engineers for Rivers and Harbors concurs with the district and division engineers in recommending modification of the existing project so as to provide for a channel 200 feet wide and 6 feet deep at low water from Stillwater to the mouth, at an estimated cost of \$19,000, with \$2,000 annually for maintenance.

[Third indorsement]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,

Washington, D. C., April 27, 1926.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY.

1. The following is in review of the reports on preliminary examination and survey of St. Croix River from Stillwater, Minn., to its mouth, authorized by the river and harbor act approved March 3, 1925.

2. The St. Croix rises in northwestern Wisconsin, about 21 miles from Lake Superior, and flows in a generally southerly direction for 166 miles, entering the Mississippi at Prescott, Wis., about 27 miles below St. Paul. The section under consideration is 23.6 miles long, and is known as St. Croix Lake. It is from 1,500 to 6,500 feet wide and from 20 to 35 feet deep, except at three localities where tributaries have created deltas which narrow and shoal the channel. There is an existing project providing for a channel 3 feet deep between the mouth and Taylors Falls, Minn., 52 miles, to be obtained by the construction of wing dams, bank protection, and dredging. The work is considered as having been completed in 1900, but the channel has deteriorated in recent years. Work of maintenance is limited to snagging. Local interests desire a channel 200 feet wide and 6 feet deep from the mouth to Stillwater.

3. There is no commerce at present, partly on account of the limited depth available and partly because of the lack of floating equipment. A small barge line is now operating on the Mississippi between St. Louis and Minneapolis. It is stated that this line would also operate on the St. Croix if the channel were improved. Business interests along the upper Mississippi and St. Croix Rivers have raised funds for the construction of additional tow boats and barges, and a contract has been made with the Inland Waterways Corporation for their operation. It is claimed that some 240,000 tons will be moved over the St. Croix if a 6-foot channel is provided.

4. The district engineer states that the cost of transporting by river certain of the items listed as prospective commerce by local interests would be materially less than the present cost by rail, the

largest estimated saving being \$1 per ton. A municipal terminal with rail connections already exists at Stillwater. Freight rates from points in the Northwest are the same to Stillwater as to St. Paul. While the latter is on the Mississippi, the district engineer believes that Stillwater offers a more favorable transfer point between rail and barge for freight to and from the Northwest, as it has better natural sites for terminal development. In addition, therefore, to the receipt and shipment of commodities at points on the St. Croix River, the district engineer thinks that a considerable transshipment business should develop. The provision of a channel through three shoals totaling about $1\frac{1}{2}$ miles in length would open a route 23 miles long to boats operating on the Mississippi. The district engineer recommends such an improvement at an estimated cost of \$19,000, with \$2,000 annually for maintenance.

5. The division engineer concurs, feeling that Stillwater will be an excellent and convenient place for the transfer or storage of such river tonnage as does not originate in, or is not destined for, the Twin Cities. He believes that Stillwater will eventually become, for river tonnage, what the "Minnesota transfer" is for railroad tonnage. He considers, however, that the improvement should be made an integral part of the Mississippi River project.

6. The development of regular water transportation on the upper Mississippi seems assured by arrangements which have been made for floating equipment. The extension of this service to points on the St. Croix River will naturally follow, as the demand already exists.

It may be too early to predict a large movement to and from the Northwest by rail and water, with Stillwater as the transfer point, but the conditions are favorable to such a development. While the river is a tributary of the Mississippi, and on the stretch in question is affected by backwater from that river, it is believed more in accord with usual practice to retain it as a separate project. In view of the potential benefits and the small cost of the work, the board concurs with the district and division engineers in recommending modification of the existing project for the improvement of St. Croix River, Wis. and Minn., so as to provide for a channel 200 feet wide and 6 feet deep at low water from Stillwater to the mouth, at an estimated cost of \$19,000, with \$2,000 annually for maintenance.

7. In compliance with law, the board reports that there are no questions of terminal facilities, waterpower, or other subjects so related to the project proposed that they may be coordinated therewith to lessen the cost and compensate the Government for expenditures made in the interests of navigation.

For the board:

EDGAR JADWIN,

Brigadier General, Corps of Engineers,

Senior Member of the Board.

PRELIMINARY EXAMINATION OF ST. CROIX RIVER, WIS. AND MINN.

SYLLABUS

The existing project provides for a channel 3 feet deep at mean low water. This depth is inadequate to meet the needs of prospective commerce, and local interests desire a channel 6 feet deep with a width of 200 feet. The district engineer considers the locality worthy of improvement to that extent and recommends that a survey be made.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
St. Paul Minn., December 22, 1925.

Subject: Preliminary examination of St. Croix River from Stillwater, Minn., to its mouth.

To: The Chief of Engineers, United States Army
(Through the Division Engineer).

1. The river and harbor act of March 3, 1925, contains an item providing for a preliminary examination and survey of St. Croix River from Stillwater, Minn., to its mouth. In accordance with the above and instructions from the Chief of Engineers dated March 19, 1925, the following report of preliminary examination is submitted:

GEOGRAPHICAL DESCRIPTION

2. The source of the St. Croix River is in northwestern Wisconsin, about 21 miles from Lake Superior and approximately 1,013 feet above sea level. The river is 166 miles long and drains an area of about 7,290 square miles. From its source it flows southwesterly and then southerly, forming for the greater part of its length the boundary between the States of Wisconsin and Minnesota. It joins the Mississippi River at Prescott, Wis., about 27 miles below St. Paul, Minn.

LOCALITY

3. The section of the St. Croix River under consideration in this report extends from Stillwater, Minn., to the mouth, a distance of 23.6 miles, and is shown on inclosed map. This section of the river, known as Lake St. Croix, is a natural lake with no appreciable slope nor current. Its formation is generally attributed to the fact that in the post-glacial period the Mississippi River, carrying considerably greater quantities of detritus than the St. Croix, built up its bed at a faster rate and formed a dam of sand and gravel across the mouth of the St. Croix Valley.

4. The lake varies in width from 1,500 to 6,500 feet, and in depth from 20 to 35 feet, except at three localities described in paragraph 11 below. It is bordered by bluffs about 200 feet high, whose sides are covered with trees and grass.

PREVIOUS REPORTS

5. Previous reports on parts or all of the waterway under consideration have been made as follows:

(a) "St. Croix and Chippewa Rivers." (H. Doc. No. 75, pt. 6, 43d Cong., 2d sess., and Annual Report of Chief of Engineers, 1875, pt. I, p. 372.)

Report on examination of St. Croix River from the Falls of St. Croix to its mouth, dated January 30, 1875.

Apparently favorable. For brush dams and removing obstructions, estimated cost \$21,758. (Basis of existing project.)

(b) "Survey of Mississippi, St. Croix, Chippewa, and Wisconsin Rivers." (H. Doc. No. 39, 46th Cong., 2d sess., and Annual Report of Chief of Engineers, 1880, p. 1590.)

Progress report pertaining to the proposed system of reservoirs on the above streams, dated December 12, 1879.

(c) "St. Croix River." (H. Doc. No. 40, 46th Cong., 2d sess., and Annual Report of Chief of Engineers, 1880, p. 1661.)

Report on survey from Taylors Falls to Prescott, dated January 26, 1880.

Apparently favorable. For dams, jetties, shore protection, dredging, and removing obstructions, estimate of cost \$60,250.

(d) Views and opinions of the Board of Engineers upon the effect of the reservoir discharges on the depth of water at and below St. Paul. (Annual Report of Chief of Engineers, 1887, p. 1680. Report of board dated May 24, 1887.)

Favorable to the reservoir system in the region already occupied by reservoirs.

Unfavorable as to the extension of the system to the St. Croix, Chippewa, and Wisconsin Rivers at present.

(e) "Harbor at Hudson, Wis." (H. Doc. No. 268, 51st Cong., 2d sess., and Annual Report of Chief of Engineers, 1891, p. 2218.)

Report on preliminary examination, dated February 10, 1891. Unfavorable.

(f) "Lake Superior and Mississippi Canal." (H. Doc. No. 330, 54th Cong., 1st sess., and Annual Report of Chief of Engineers, 1896, p. 2390.)

Final report on examination and survey, dated March 10, 1896. (A preliminary report was published in Annual Report of Chief of Engineers, 1895, pp. 2587 and 2588.)

Report confined to the question of feasibility. Route via Allouez Bay and Brule and St. Croix Rivers considered most feasible.

(g) "Lake Superior-Mississippi River." (H. Doc. No. 69, 56th Cong., 1st sess., and Annual Report of Chief of Engineers, 1900, p. 3613.)

Supplementary report on examination and survey, dated June 14, 1899. Unfavorable.

(h) "Examination of St. Croix River, from Stillwater Harbor to Taylors Falls, Minn." (H. Doc. No. 104, 56th Cong., 1st sess., and Annual Report of Chief of Engineers, 1900, p. 2836.)

Report on preliminary examination, dated March 25, 1899, favorable to the extent of keeping the stream in sufficiently good condition to permit boats to run except at the lowest stages. Survey not made.

Plan and estimate, dated July 14, 1899, for dredging the worst bars, the construction and repair of wing dams, and removing snags and logs, etc., at an estimated cost of \$1,000 per annum.

(i) "St. Croix River, Minn. and Wis." (H. Doc. No. 686, 59th Cong., 1st sess.)

Report on preliminary examination, from Taylors Falls to the mouth, dated March 15, 1906.

Favorable by district engineer for a 4-foot channel, and recommends a survey at an estimated cost of \$3,000.

Favorable by Board of Engineers and Chief of Engineers for an annual appropriation of \$3,600 for maintenance of improvement in accordance with the existing project, but did not recommend a survey with a view to increasing the channel depth to 4 feet.

(j) "Canal connecting Lake Superior and the Mississippi River by way of the St. Croix River, Minn. and Wis." (H. Doc. No. 304, 61st Cong., 2d sess.)

Report on a preliminary examination, dated August 30, 1909. Unfavorable.

(k) "St. Croix River at Afton, Minn." (H. Doc. No. 422, 62d Cong., 2d sess.)

Report on preliminary examination dated November 7, 1910. Unfavorable.

(l) "Waterway from Lake Superior to the Mississippi River." (H. Doc. No. 1008, 64th Cong., 1st sess.)

Report of a special board of Engineer officers, dated May 14, 1913. Unfavorable.

(m) "St. Croix River, Minn. and Wis., up to Taylors Falls." (H. Doc. No. 1699, 64th Cong., 2d sess.)

Report on preliminary examination, dated May 27, 1916. Unfavorable.

EXISTING PROJECT

6. The section of the river under consideration is included in a project providing for dredging, construction of wing dam, and bank protection, in order to obtain a channel depth of 3 feet at mean low water between the mouth and Taylors Falls, Minn. (28.7 miles above Stillwater), and for the improvement of the harbor and water front at Stillwater, Minn. The existing project was authorized by the following river and harbor acts: The act of June 18, 1878, providing for dredging, etc. (H. Doc. No. 75, pt. 6, 43d Cong., 2d sess.); the act of June 3, 1896, provided for the improvement of the harbor and water front at Stillwater.

WORK PREVIOUSLY DONE

7. Work of improvement of the St. Croix River was commenced above Stillwater in August, 1878, and below Stillwater in the latter part of the season of 1882. The work at and below Stillwater comprised the construction of a training dam and wing dam at Hudson Bar, a wing dam at Catfish Bar near Afton; and dredging at Catfish Bar, Hudson Bar, and the harbor at Stillwater.

8. The total expenditures to June 30, 1925, for improvement of the St. Croix River from Taylors Falls to Stillwater were \$161,265, of which \$29,855.50 was for maintenance. The portion of these amounts which has been applied to the improvement of the section of the river under consideration in this report can not be determined.

9. The project for improvement of the St. Croix River is considered as having been completed in 1900. Expenditures for maintenance during the past few years have been small, and the channel has deteriorated.

10. At Stillwater the ordinary fluctuations between mean low and mean high water are about 10 feet, and between extreme low and extreme high about 17.8 feet. Since there is very little fall in the river from Stillwater to the mouth, the stage in this section is largely controlled by the stage of the Mississippi River. Low stages during the navigation season ordinarily occur in the late summer and fall and high stages in the spring. The river is closed by ice from the middle of November to the middle of April. The flow varies from a minimum of about 1,140 second-feet to a maximum of about 37,200 second-feet.

NAVIGABLE EXTENT

11. As explained previously, the section of the St. Croix River under consideration is a natural lake with ample widths and depths for river traffic except at three localities.

(a) At Hudson, Wis. (17 miles above the mouth), the delta of the Willow River in Lake St. Croix has reduced the width of the lake channel to an average of about 200 feet and the depth to an average of about 5 feet at low water for a distance of a little over a mile. The controlling depth in this section in 1925 was 3.5 feet.

(b) At Catfish Bar (11.7 miles above the mouth) the delta of a small creek from the Minnesota side and a natural sand spit from the Wisconsin side have narrowed the channel to about 200 feet. While the controlling depth here is about 6 feet at low water, the channel makes an abrupt rectangular turn to the east just above the bar so that a tow can not follow the deep water.

(c) The delta of the Kinnikinic River (6.3 miles above the mouth) has narrowed the channel to about 150 feet for a distance of 1,000 feet. The controlling depth, however, is about 9 feet and the channel is straight.

BRIDGES

12. The following is a list of bridges over the river in the section under consideration:

Owner	Location		Character	Channel spans				
	Miles above mouth	Nearest town, etc.		Normal to channel			Clear height	
				Left	Center	Right	Mean low water	High water
				Feet	Feet	Feet	Feet	Feet
City of Stillwater.....	23.6	Stillwater, Minn.	Pontoon and pile bents.	-----	120	-----	-----	-----
Chicago, St. Paul, Minneapolis & Omaha Ry.	17.5	Hudson, Wis.	Swing.....	120	-----	118	21.6	6.8
City of Hudson.....	16.9	do.	Fixed.....	-----	120	-----	61	48
Prescott Bridge Co.....	.17	Prescott, Wis.	Vertical lift.....	-----	160	-----	72.8	55
Chicago, Burlington & Quincy Ry.	.1	do.	Swing.....	154	-----	154	27.5	10

DIFFICULTIES OF NAVIGATION

13. There are no unusual difficulties attending navigation in this section except for shallow depth and narrow channel at the three localities described above.

CONNECTING WATERWAYS

14. The waterway of approach is the Mississippi River, navigable from Minneapolis to the Gulf of Mexico, into which the St. Croix River flows at Prescott, Wis., 27 miles below St. Paul, Minn. This section of the Mississippi River is under improvement for a channel depth of 6 feet, the present controlling depth, however, being between 4 and 5 feet.

CITIES

15. Municipalities along the river, with their population, are as follows:

Municipality	Miles above mouth	Population 1920 census
Stillwater, Minn.	23.6	7,735
Bayport, Minn.	19.9	1,936
Hudson, Wis.	17.5	3,014
Afton, Minn.	11.4	183
Prescott, Wis.	0.0	892

RESOURCES

16. *Stillwater, Minn.*—There are three banks in Stillwater, with a total capital of \$475,000 and deposits of \$6,000,000. Factories employing 1,120 persons include the manufacture of iron and steel articles, flour, lumber products, twine, shoes, and clothing. Stillwater is a jobbing center for groceries, clothing, etc., for the St. Croix Valley.

Bayport, Minn.—There is one bank with a capital of \$20,000 and deposits of over \$300,000. Door and window frames and binder twine constitute the principal articles of manufacture.

Hudson, Wis.—There are two banks, with a capital of \$225,000 and deposits of \$1,500,000. The principal industry is the repair shop of the Northwestern Railway, employing 500 men. Other industries include grain elevator, feed mill, creamery, and lumberyard.

17. Prescott is on the main line of the Chicago, Burlington & Quincy Railway. Hudson is on the St. Paul-Chicago line of the Northwestern (Chicago, St. Paul, Minneapolis & Omaha Railway). Stillwater is served by branch lines of the Northern Pacific from White Bear, the Chicago, Milwaukee & St. Paul from Hastings, and the Northwestern from Hudson. Bayport is on the last two branch lines.

18. The towns of the St. Croix Valley are all interconnected by gravel roads, with bridges across the lake at Prescott, Hudson, and Stillwater. There is a concrete highway and an interurban electric line from Stillwater to St. Paul, 18 miles to the west.

19. The principal item of export from the St. Croix Valley in former years was lumber, but with the destruction of the pine forests of Minnesota and Wisconsin this industry has now disappeared. Except for a small quantity of manufactured articles, the principal items of export are now grain and dairy products.

20. The only remaining item of export of consequence is crushed trap rock from a quarry 25 miles north of Stillwater, located at Dresser Junction, Wis., on the Soo Line Railroad. The output of this quarry, about 200,000 tons a year, is marketed mainly within a radius of 50 miles, but in spite of high freight rates some rock was shipped all-rail last year to Iowa points for road construction work.

COMMERCIAL STATISTICS

21. There is no commerce on the river at the present time other than pleasure launches and an occasional steamboat excursion. In former years this section of the river was used in the rafting of logs and manufactured lumber to points down the Mississippi River, but this commerce ceased in 1915. The river was also used to some extent by steamboats in the passenger and freight business. The last steamboat to operate regularly on this section of the river made side trips to Stillwater on its downstream run between St. Paul and Davenport, Iowa. This boat was taken off the upper Mississippi in 1917.

PROSPECTIVE RIVER COMMERCE

22. In the traffic survey made by the Stillwater Association (Exhibit D of report of public hearing) an estimate is made of about 240,000 tons of freight for the St. Croix Valley available for shipment via barge line to and from points along the Mississippi River. The largest items are coal, 82,198 tons, and lumber, 27,003 tons, both incoming; and trap rock, 100,000 tons, outgoing.

23. The current freight rate on coal from southern Illinois to Stillwater is \$3.20 to \$3.75 per ton, which is from 4.1 to 4.8 mills per ton-mile river distance. For upstream towing this rate would about cover only the cost of the movement plus the loading, unloading, and delivery charges, leaving no margin for profit, hence no reason for the change in routing from rail to barge line.

24. Some trap rock now moves by rail to points in Iowa at a rate of \$2.40 a ton. This shipment originates on the railroad and although the terminus is not stated it probably is at points distant from the Mississippi River. Road material for points in Iowa near the river is now obtained by dredging from gravel deposits in the bed of the Mississippi, and I doubt if trap rock from the St. Croix Valley can successfully compete with this relatively cheap gravel at a cost sufficient to pay for the short rail or motor-truck hauls and the two transfers involved plus the cost of moving it in barges.

25. Practically all of the lumber included in the estimate comes from the west coast. That this can be brought around via the Panama Canal to New Orleans thence up the Mississippi River to Stillwater more cheaply than via the transcontinental railroads remains to be proved.

26. Eliminating these three items leaves a balance of about 30,000 tons of miscellaneous freight which might seek the river if a better channel were available.

TERMINAL AND TRANSFER FACILITIES

27. The only terminal on this section of the river is at Stillwater. It consists of a concrete paved levee, 550 feet long and 40 feet wide, sloping from the top of the river bank to the water. It was built by the city and is open to the public. No unloading or transfer facilities are provided. Adjacent to the levee are railroad tracks connecting with branch lines of the Northwestern, the Chicago, Milwaukee & St. Paul, and the Northern Pacific Railroads.

28. A large part of the river frontage on the Minnesota side, extending from $1\frac{1}{2}$ miles above the Stillwater Bridge to about 12 miles below, is suitable for the development of terminals.

IMPROVEMENT DESIRED

29. A well-attended public hearing was held by the district engineer at Stillwater, Minn., on August 21, 1925. A stenographic report of the hearing is inclosed.¹ Mr. L. S. Miller, secretary of the Stillwater Association of Public and Business Affairs, presented the main argument for the improvement. A channel from the mouth to Stillwater is desired, at least 6 feet deep and 200 feet wide at low water. These are the project dimensions for that part of the Mississippi River adjoining the locality under discussion.

30. This channel can be obtained by means of a dredged cut a little over a mile long and from 2 to 3 feet deep at Hudson and two short cuts of a few hundred feet each at Catfish bar (11.7 miles above the mouth) and at the mouth of the Kinnikinic (6.3 miles above the mouth). The material to be moved is sand and the total quantity probably would not exceed 75,000 yards. A suction dredge pertaining to the improvement of the Mississippi River would be available for this work.

EFFECT OF IMPROVEMENT

31. The proposed improvement would make available to any craft navigating the upper Mississippi River, a channel 23 miles long and serving a section whose population is about 50,000.

LOCAL COOPERATION

32. No cooperation has been offered in providing the desired improvement nor should any be demanded as the benefits from the use of the improved channel would be widespread in character.

SPECIAL SUBJECTS

33. There are no features in connection with the proposed improvement such as the generation of power, land reclamation, irrigation or drainage, which could profitably be combined with the improvement for navigation.

DISCUSSION

34. In previous years, when there were more boats operating on the upper Mississippi River, side trips were often made to Stillwater. When low water prevented steamboat navigation on the St. Croix,

¹ Not printed.

the head of navigation on the Mississippi was usually at some point below the mouth of the St. Croix River. As a result of the continued improvement of the Mississippi River, however, such is no longer the case and St. Croix points are at times isolated from river transportation moving on the Mississippi. During the season of 1925, for example, the River Transit Co. had to refuse a shipment of sisal from St. Louis to Bayport, Minn., on account of lack of sufficient depth in Lake St. Croix at Hudson, Wis.

RECOMMENDATION

35. In view of the small amount of improvement necessary to make the channel of the St. Croix River as far as Stillwater equal to that projected for the upper Mississippi River, I am of the opinion that the United States is justified in undertaking the proposed improvement. A survey to determine quantities and costs is therefore recommended.

C. F. WILLIAMS,

Major, Corps of Engineers, District Engineer.

[First indorsement]

OFFICE DIVISION ENGINEER, WESTERN DIVISION,

St. Louis, Mo., January 8, 1926.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY,

Washington, D. C.

1. It is recommended that survey and estimate be made.
2. The division engineer is of the opinion that the project for the upper Mississippi River should be extended to Stillwater, regardless of the showing of freight that might be shipped to or from that point. He looks upon Stillwater, with its extensive and easily developed river front, and with its present and easily increased railroad facilities, as the place where first relief may be had from any congestion in river tonnage; which may be felt in St. Paul and Minneapolis, where terminal facilities must necessarily be limited. Stillwater will be an excellent and convenient place for the transfer, or storage, of such river tonnage as does not originate in, or is not destined for, the Twin Cities. It is believed that Stillwater will eventually become, for river tonnage, what the "Minnesota transfer" is for railroad tonnage.

CHAS. L. POTTER,

Colonel, Corps of Engineers.

[Third indorsement]

BOARD OF ENGINEERS FOR RIVERS AND HARBORS,

Washington, D. C., January 26, 1926.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY.

1. For the reasons stated above, the board concurs with the district and division engineers in recommending a survey to determine the advisability and extent of the improvement.

For the board:

EDGAR JADWIN,

Brigadier General, Corps of Engineers,

Senior Member of the Board.

SURVEY OF ST. CROIX RIVER, WIS. AND MINN.

SYLLABUS

The district engineer believes that the demands of commerce for an improved channel warrant the estimated expenditure of \$19,000 for the improvement, and recommends that the existing project for the St. Croix River be revised so as to include a channel 200 feet wide and 6 feet deep at low water from Stillwater, Minn., to its mouth.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
St. Paul, Minn., April 5, 1926.

Subject: Survey of St. Croix River from Stillwater, Minn., to its mouth.

To: The Chief of Engineers, United States Army
(Through the Division Engineer).

1. The river and harbor act of March 3, 1925, provides for a preliminary examination and survey of St. Croix River from Stillwater, Minn., to its mouth. The report on preliminary examination was submitted December 22, 1925. Under instructions contained in letter¹ of February 3, 1926, from the Chief of Engineers authorizing a survey of the locality, the following report on the survey is submitted:

2. The survey was made in March, 1926. Soundings were taken at the localities where restricted widths or depths for river navigation were anticipated. Three maps are inclosed, upon which the results of the survey are indicated.¹

RESULTS OF SURVEY

3. (a) At Hudson, Wis. (17 miles above the mouth), for a distance of 5,600 feet along the channel, the delta of the Willow River has reduced the navigable channel to an average width of about 200 feet. The depths vary from 3.6 feet to over 8 feet at low water.

(b) At Catfish Bar (11.7 miles above the mouth), a natural sand spit from the Wisconsin shore and the delta of Bowles Creek flowing into the lake from the Minnesota side have reduced the width and depth. A dike was built at this locality in the eighties to control the deposit from Bowles Creek but without much success, and the delta has now encroached upon the lake above Catfish Bar to such an extent as to require boats to make a sharp turn within a distance measured along the center line of the channel of 300 or 400 feet. Obviously, a tow 350 feet long can not easily follow such a channel, and the difficulties are enhanced by a current estimated at about 2 miles per hour caused by the restricted section at this locality. The controlling depth here, over a channel width of 200 feet, is 4.9 feet at low water.

(c) At the delta of the Kinnikinic River (6.3 miles above the mouth), the channel is restricted for about 1,500 feet to width less than 200 feet. The controlling depth over a tortuous channel about 100 feet wide is 8 feet at low water but over a 200-foot channel it is zero.

4. Previous experience in dredging in Lake St. Croix indicates that the material to be removed in improving these localities is sand with some bark and slabs, refuse from former logging days.

¹ Not printed.

This material can easily be removed by a pipe-line hydraulic dredge. There are sufficient dumping grounds for the dredged material within reach of the ponton line of the dredge (500 feet) either in the deep water of the lake or on the shoals alongside the cut. As these areas are well below the ordinary high-water mark, they may be occupied by the United States without let or hindrance of the riparian owners

PLAN FOR IMPROVEMENT

5. As explained in the report of preliminary examination, the existing project for the St. Croix River provides for a channel 3 feet deep at mean low water (width not specified) from the mouth to Taylors Falls (28.7 miles above Stillwater, Minn.). In order that boats operating on the Mississippi River may navigate the St. Croix River as far as Stillwater, Minn., an increase of the project depth to 6 feet at low water, which is the project depth of the Mississippi River below the mouth of the St. Croix, with a channel 200 feet wide, is requested.

6. The location of the proposed channel is shown on the inclosed maps.¹ While a channel 150 feet wide would probably be sufficient to care for present and prospective commerce, it is considered best to make a cut 200 feet wide while the dredge is on the grounds in order to take care of the movement of material into the sides of the cut for several years to come. For the same reason it is proposed to dredge to an overdepth of 2 feet. The cost and frequency of maintenance dredging will thereby be so reduced as to make the net cost over a long period of years lower than if the initial dredging were restricted to the dimensions now required.

ESTIMATED COST OF IMPROVEMENT

7. The amount of material to be removed in order to establish a channel 200 feet wide and 6 feet deep (with an overdepth of 2 feet) at the localities described above is as follows:

	Cu. yds.
At Hudson.....	98,000
At Catfish Bar.....	28,000
At Kinnikinic River.....	30,000
Total.....	156,000

8. The estimated cost including all overhead charges, based on a unit cost of 12 cents per cubic yard, is \$19,000. This estimate is premised on the availability of a pipe-line dredge pertaining to the improvement of the Mississippi River for two months.

9. The estimated cost of maintenance is \$2,000 a year.

COMMERCE

10. Although there is no commerce moving on the river at the present time, it would appear from data submitted at the public hearing held in connection with the preliminary examination and from a statement submitted by the warden of the State prison at Stillwater, of which a copy¹ is inclosed, that the river would be used as soon as a dependable channel is provided. The State prison in securing sisal fiber for binder twine ships by the Mississippi River some

¹ Not printed.

7,500 tons annually from New Orleans to St. Louis and thence by rail, but would make all-river shipment if possible. Their present method of routing represents a saving of 7 cents per hundredweight over the all-rail rate applying from New Orleans to Stillwater. A further saving of 5 cents per hundredweight would seem probable if shipments were made via barge line for the entire distance.

11. A small barge line is now operating on the Mississippi River between St. Louis and Minneapolis. It would also operate on the St. Croix if that river were improved. In addition to this line, business interests along the upper Mississippi and St. Croix Rivers have raised funds for the construction of towboats and barges which the Inland Waterways Corporation is under contract to operate in service north of St. Louis. This new equipment will probably be in service by the spring of 1927.

DISTRIBUTION OF BENEFITS

12. Although possible tonnage which will seek the improved route of the St. Croix River has been confined in this report and that of the preliminary examination to items which are largely produced or consumed along the banks of the river, the benefits of the reduced cost of transporting these items is not confined to the localities immediately adjacent to the river. In the case of the lowered cost of sisal to the Minnesota State prison, for example, this saving will be reflected in the price of binder twine to the farmers throughout the Northwest. As the estimated benefits are more national than local in character, the cost of the improvement should be borne by the Federal Government.

DISCUSSION

13. By the improvement of little more than $1\frac{1}{2}$ miles of channel in Lake St. Croix, a route 23 miles long between Stillwater, Minn., and Prescott, Wis., is opened to boats operating on the Mississippi River. Stillwater is about the same distance from Prescott as is the southern boundary of St. Paul. On account of the absence of current and the greater average depth in Lake St. Croix than in the Mississippi River above Prescott, tows can make the round trip to Stillwater in less time and with a smaller consumption of fuel than to St. Paul. The freight rates from points in the Northwest to Stillwater are the same as to St. Paul and the natural sites for terminals are better at the former locality. All of which points to the possibility that Stillwater rather than St. Paul may develop into the transshipping point between rail and barge for freight to and from the Northwest not destined for St. Paul or Minneapolis.

RECOMMENDATION

14. It is believed that the benefits which may reasonably be expected to be derived from the proposed improvement are commensurate with the cost thereof. It is therefore recommended that the existing project for the improvement of the St. Croix River be revised to include a channel 200 feet wide and 6 feet deep at low water from Stillwater, Minn., to its mouth.

APPROPRIATIONS REQUIRED

15. If the project is revised as recommended above, the full amount of the estimate, \$19,000, should be made available at the time of the first appropriation in order that the work may be prosecuted economically. Funds for maintenance will probably be required in sums of \$6,000 every third year.

C. F. WILLIAMS,

Major, Corps of Engineers, District Engineer.

[First indorsement]

OFFICE DIVISION ENGINEER, WESTERN DIVISION,

St. Louis, Mo., April 9, 1926.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY.

1. This office concurs in the recommendation that a channel 200 feet wide and 6 feet deep be provided from the Mississippi River to Stillwater. This, however, should more logically be executed as an extension to Stillwater of the project for the upper Mississippi River. It is simply extending that project to another terminal. This method of handling the project will simplify the matter, should there ever be a change back to the old method of appropriation for individual projects. It is not a project for improving the St. Croix River, but an extension of the Mississippi River project to Stillwater. It will also avoid carrying a separate account in all financial papers; will simplify committee work in Congress; will automatically change this section to fit the Mississippi River project, if any change in the latter should be made; and will leave the project for the St. Croix River unchanged.

2. It is recommended that the project for the "Mississippi River between Missouri River and Minneapolis, Minn." be extended to Stillwater, Minn.

CHAS. L. POTTER.

Colonel, Corps of Engineers.

RECOMMENDATION